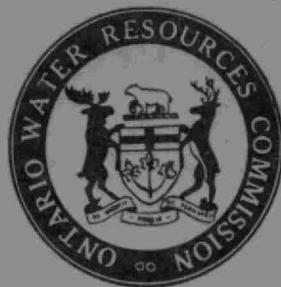


STANDARDS DEVELOPMENT BRANCH OMIE



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THE
ONTARIO WATER RESOURCES
COMMISSION

WATER POLLUTION SURVEY

of the

TOWNSHIP OF MAIDSTONE

in the

COUNTY OF ESSEX

1967

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Report on a water pollution
survey of the township of
Maidstone, county of Essex.

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REPORT

ON A

WATER POLLUTION SURVEY

OF THE

TOWNSHIP OF MAIDSTONE

COUNTY OF ESSEX

JUNE, 1967

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

ONTARIO WATER RESOURCES COMMISSION

REPORT

INTRODUCTION

A water pollution survey of private and municipal surface water drains in the Township of Maidstone was conducted on June 8, 1967.

Mr. L. St. Pierre, Clerk, Township of Maidstone, provided information pertinent to the survey.

GENERAL

The section of the Township of Maidstone in which the survey was conducted is bounded by Lake St. Clair on the north, the Canadian Pacific Railway on the south, the Puce River on the west, and the Second Concession Road on the east. This area includes the Settlement of Emeryville.

In general, drainage water from the area west of Dubois Street discharges into the Fourth Concession Drain. The drainage water from the area east of Dubois Street discharges into the Third Concession Drain. Local drainage is provided by municipal drains and storm sewers which in turn flow to Lake St. Clair.

Septic tank systems are utilized on most properties for the treatment of domestic wastes and sanitary sewage. A few privies are also in operation. Heavy clay soil conditions, combined with a high water table tend to result in unsatisfactory operation of field-tile disposal beds in many instances. These conditions

result in the discharge of inadequately treated septic tank effluent into surface water drains.

The water pollution survey consisted of the locating of municipal and private surface water drains and storm sewers and on investigation included the sampling of each to determine the level of pollution being discharged from the Emeryville area.

Sampling was carried out approximately 12 hours after a heavy rain had occurred, evidence of surface water run-off was still noticeable in the drains. It may therefore be assumed that a higher concentration of pollution in the drains may be indicated during periods of dry weather when less diluted water is present.

The sanitary chemical analyses and the bacteriological examination results of samples collected are listed in the attached Tables I and II. The locations of sampling points are designated on the accompanying map.

PREVIOUS SURVEY AND RECOMMENDATIONS

A water pollution survey of the area was carried out by the OWRC in July 1964. The report revealed a prevalence of sewage disposal problems. Numerous municipal storm sewers were conveying inadequately treated sewage flows with adverse effects resulting. It was recommended that the practice of discharging inadequately treated sewage from private drains to the municipal storm sewers and watercourses within the township be discontinued. It was also recommended

that the solution to these waste water problems would be the installation of a system of sanitary sewers and an adequate method of waste treatment. To date no action has been taken towards this recommendation.

REFUSE DISPOSAL

The Township of Maidstone and the Settlement of Emeryville use an 8-acre open face refuse disposal site located on Lot 15, Concession 4, of the Township of Maidstone. At the time of the inspection leachate from refuse on the bank of the Fourth Concession Drain was entering this drain.

SIGNIFICANCE OF LABORATORY ANALYSES

Reference to the appendix should be made for the interpretation of laboratory analyses regarding the OWRC objectives for surface water quality.

Fourth Concession Drain

The sanitary chemical analyses and bacteriological examination of the samples collected from the Fourth Concession Drain showed coliform organism counts and suspended solids figures above OWRC water quality objectives for surface water drains (Sample 1 and 2). As stated previously, the samples were taken about 12 hours after rains in the area and the resultant low BOD and high suspended solids content of the samples are probably associated with the dilution provided and the silt carried by the runoff water. However,

the presence of significant coliform organisms is still indicative of sanitary wastes. Domestic wastes and sanitary sewage are probably the major cause of this pollution.

Third Concession Drain

The laboratory analyses of samples collected from the Third Concession Drain also revealed a condition of pollution. Several drains leading from private properties and discharging into the Third Concession drain were located. Visible waste and characteristic conditions around these outfalls showed that inadequately treated wastes were being discharged. High coliform organism counts and anionic detergent content were found in samples 3, 4, 5, and 6. These results indicate water pollution from private waste disposal systems.

Second Concession Drain

The analyses of samples collected from this drain also showed pollution conditions. The high coliform organism count and anionic detergent content (Samples 7, 8, and 9), indicate that the pollution is coming from domestic sources.

Surface Water Drains - Emeryville Area

Samples collected from manholes on storm sewers in the Emeryville area (sample 10 to 15), showed significant coliform organism counts and anionic detergent contents, indicating that sanitary sewage and domestic waste are the major source of the pollution.

DISCUSSION

The sample analyses results confirmed the conditions found in the previous survey (1964). Serious pollution conditions exist in the second, third and fourth concession drains as well as other surface water drains in the Emeryville area.

In April 1967, a letter was sent by the OWRC to the township informing of a proposed project for the treatment of wastes from the Village of Belle River, and inviting the township to join in this project. In a subsequent reply, the Township of Maidstone Council indicated that it did not feel the necessity for sewage disposal plant facilities at the present time since the land in the township designated as residential was nearly all used up.

During the course of the survey the pollution situation in the Maidstone area was also discussed with the Metro Windsor-Essex County Health Unit. It was learned that primarily because of heavy clay type soil conditions in the township area, any type of system which depended on disposal of waste by absorption in the soil could not operate satisfactorily, and as a consequence persistent problems had resulted with the systems in the townships.

The general conclusion of this survey therefore, is that a municipal collection and treatment system would be the best method of correcting the pollution situation in this area. Until such a system is available, any further development which proposes to use some form of soil absorption system for waste disposal would

probably result in added pollution to local drains and as a consequence should be discouraged. Because of the limited and at certain times non existant dilution capacity in the township surface water drains, under drained tile bed systems as a means of treatment for individual houses should also be limited. In the meantime, every effort should be made to repair and maintain the existing private systems to reduce the pollution situation until a municipal communal sewerage system can be provided.

SUMMARY

A water pollution survey was conducted in the Emeryville area of the Township of Maidstone.

Conditions of water pollution in private and municipal drains were disclosed as outlined in this report.

The refuse disposal site used by the Township of Maidstone presented a pollution hazard to nearby watercourses.

RECOMMENDATIONS

1. A pollution abatement programme should be instituted for the Township of Maidstone. Such a programme should include the installation of a system of sanitary waste collection sewers and an adequate method of waste treatment for the Emerville area. Until such a system is available, efforts should be made to repair existing systems to minimize pollution.

2. Since, soil and receiving watercourse conditions are not suitable, further development utilizing septic tank and disposal bed systems or underdrained tile beds should be discouraged.

3. The Township refuse disposal site operation should be improved so it does not present a hazard to nearby watercourses.

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Prepared by A. Burlachko
for W. L. Talbot, Civil Technologist,
Division of Sanitary Engineering.

TABLE I

TOWNSHIP OF MAIDSTONE - WATER POLLUTION SURVEY

Location of Sampling Points	Description of Sampling Points	Date Sampled	5-Day BOD (ppm)	Total (ppm)	S O L I D S Susp. (ppm)	Diss. (ppm)	Anionic Detergent as ABS (ppm)	Coliforms per 100 ml. Membrane Filter
<u>FOURTH CONCESSION DRAIN</u>								
1	Drain at bridge in Cemetery Upstream from Emeryville	June 8/67	3	658	103	555	0.0	30,000
		July 7&8/64	18.0	450	104	346	0.2	56,000
2	North of CNR tracks near outfall to Lake St.Clair	June 8/67	9	872	114	758	0.1	4,000,000
		July 7&8/64	100.0	2468	2154	314	2.3	10,700,000
<u>THIRD CONCESSION DRAIN</u>								
3	East Side, Private Drain from R.Keepings property	June 8/67	580	6184	4084	2100	88.0	45,000,000
4	East Side Private Drain from W.C. Lauzon property	June 8/67	215	1358	520	838	21.0	2,000,000
5	West Side, approx. 320 yds south of Hwy. #39	June 8/67	4	800	60	740	0.3	500,000,000
		July 7&8/64	8.4	426	13	413	2.0	490,000
6	West Side, mouth of ditch near out- fall to Lake St.Clair	June 8/67	5	796	269	527	0.1	310,000

TABLE I (CON'T)

TOWNSHIP OF MAIDSTONE - WATER POLLUTION SURVEY

Location of Sampling Points	Description of Sampling Points	Date Sampled	5-Day BOD (ppm)	S O L I D S			Anionic Detergent as ABS (ppm)	Coliforms per 100 ml Membrane Filter
				Total (ppm)	Susp. (ppm)	Diss. (ppm)		
<u>SECOND CONCESSION DRAIN</u>								
7	Brown's Creek at turn in Creek south of Hwy #39	June 8/67	2	726	125	601	0.1	200,000
8	Manhole on Storm Sewer south of CNR tracks near Lake St.Clair	June 8/67	14	702	230	472	11.0	52,000,000
9	Brown's Creek at mouth, near Lake St.Clair	June 8/67	6	646	31	615	0.3	50,000
		July 7&8/64	80.0	1718	450	1268	16.0	19,000,000

TABLE IITOWNSHIP OF MAIDSTONE - WATER POLLUTION SURVEYSURFACE WATER DRAINS - EMERYVILLE AREA

Location of Sampling Points	Description of Sampling Points	Date Sampled	5-Day BOD (ppm)	S O L I D S			Anionic Detergents as ABS (ppm)	Coliforms per 100 ml. Membrane Filter
				Total (ppm)	Susp. (ppm)	Diss. (ppm)		
10	South Side of Caruhel Dr. where it turns east	June 8/67	20	2954	303	2651	0.2	20,000
11	South West Corner of Hwy. #39 and Caruhel Dr.	June 8/67	20	1338	528	810	1.0	13,000,000
12	Emery St. at Church St. at S.W. Corner	June 8/67	12	622	35	587	0.8	228,000
13	Emery St. at Hwy. #39 at S.W. Corner	June 8/67	24	714	70	644	3.5	20,000,000
14	Duboir Ave. South at Hwy. #39, one third way up Dubois St. on S.W. Corner	June 8/67	100	2087	1262	820	11.4	19,000,000
15	South Side Hwy. #39 near Conc. No.3 Rd.	June 8/67	14	890	14	876	1.1	1,400,000

APPENDIX I

SIGNIFICANCE OF LABORATORY ANALYSES

Bacteriological Examination

The presence of coliforms indicates pollution from human or animal excrement, or from some non-faecal forms. The objectives for surface water quality in Ontario is a maximum of 2400 organisms per 100 millilitres.

The OWRC Laboratories employ the Membrane Filter (MF) technique of examination to obtain a direct enumeration of coliform organisms. The Department of Health Laboratories use the Most Probable Member (MPN) enumeration and coliform counts are reported as Total Coliform Organisms (TC) and Faecal Coliform Organisms (FC).

Sanitary Chemical Analyses

Biochemical Oxygen Demand (BOD)

Biochemical Oxygen Demand is reported in parts per million (PPM) and is an indicated of the amount of oxygen required for the stabilization of decomposable organic or chemical matter in water. The completion of the laboratory test required five days, under the controlled incubation temperature of 20° Centigrade.

The OWRC objective for surface water quality is an upper limit of four (4) ppm.

Solids

The value for solids, expressed in parts per million, is the sum of the values for the suspended and the dissolved matter in the water. The concentration of suspended solids is generally

the most significant of the solids analyses with regard to surface water quality. The effects of suspended solids in water are reflected in difficulties associated with water purification, decomposition in streams and injury to the habitat of fish.

Nitrogen

Ammonia Nitrogen or sometimes called free ammonia is the insoluble product in the decomposition of nitrogenous organic matter. It is also formed when nitrates and nitrites are reduced to ammonia either biologically or chemically. Some small amounts of ammonia, too, may be swept out of the atmosphere by rain water.

The following values may be of general significance in appraising free ammonia content: Low 0.015 to 0.03 ppm; moderate 0.03 to 0.10 ppm; high 0.10 or greater.

Total Kjeldahl is a measure of the total nitrogenous matter present except that measured as nitrite and nitrate nitrogens. The Total Kjeldahl less the Ammonia Nitrogen measures the organic nitrogen present. Ammonia and organic nitrogen determinations are important in determining the availability of nitrogen for biological utilization. The normal range for Total Kjeldahl would be 0.1 to 0.5 ppm.

Nitrite Nitrogen

Nitrite is usually an intermediate oxidation of ammonia. The significance of nitrites, therefore, varies with their amount, sources, and relation to other constituents of the

sample, notably the relative magnitude of ammonia and nitrite present. Since nitrite is rapidly and easily converted to nitrate, its presence in concentrations greater than a few thousandths of a part per million is generally indicative of active biological processes in the water.

Nitrate Nitrogen

Nitrate is the end product of aerobic decomposition of nitrogenous matter, and its presence carries this significance. Nitrate concentration is of particular interest in relation to the other forms of nitrogen that may be present in the sample. Nitrates occur in the crust of the earth in many places and are a source of its fertility.

The following ranges in concentration may be used as a guide: low less than 0.1 ppm; moderate 0.1 to 1.0 ppm; high greater than 1.0 ppm.

Anionic Detergents as ABS

The presence of anionic detergents as ABS is an indication that domestic waste is present.

Phenols

The presence of phenol or phenolic equivalents is generally associated with discharges containing petroleum products, or with wastes from some industries. It is generally conceded that adequate protection of surface waters will be provided if the concentration of phenols in waste discharges does not exceed

20 parts per billion (ppb). Phenolic type waste can cause objectionable conditions in water supplies and might taint the flesh of fish.

Iron

Water for domestic use should contain less than 0.3 parts per million of iron in order to avoid objectionable tastes, staining and sediment formation. Iron concentrations of not greater than 17 parts per million in waste discharges should permit adequate protection of surface waters.

APPENDIX

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMS

Currently, there are three general methods which may be utilized for implementing sewage and water works programs. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debt retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital

cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minute that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALY-OWNED WORKS

In June, 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new program allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

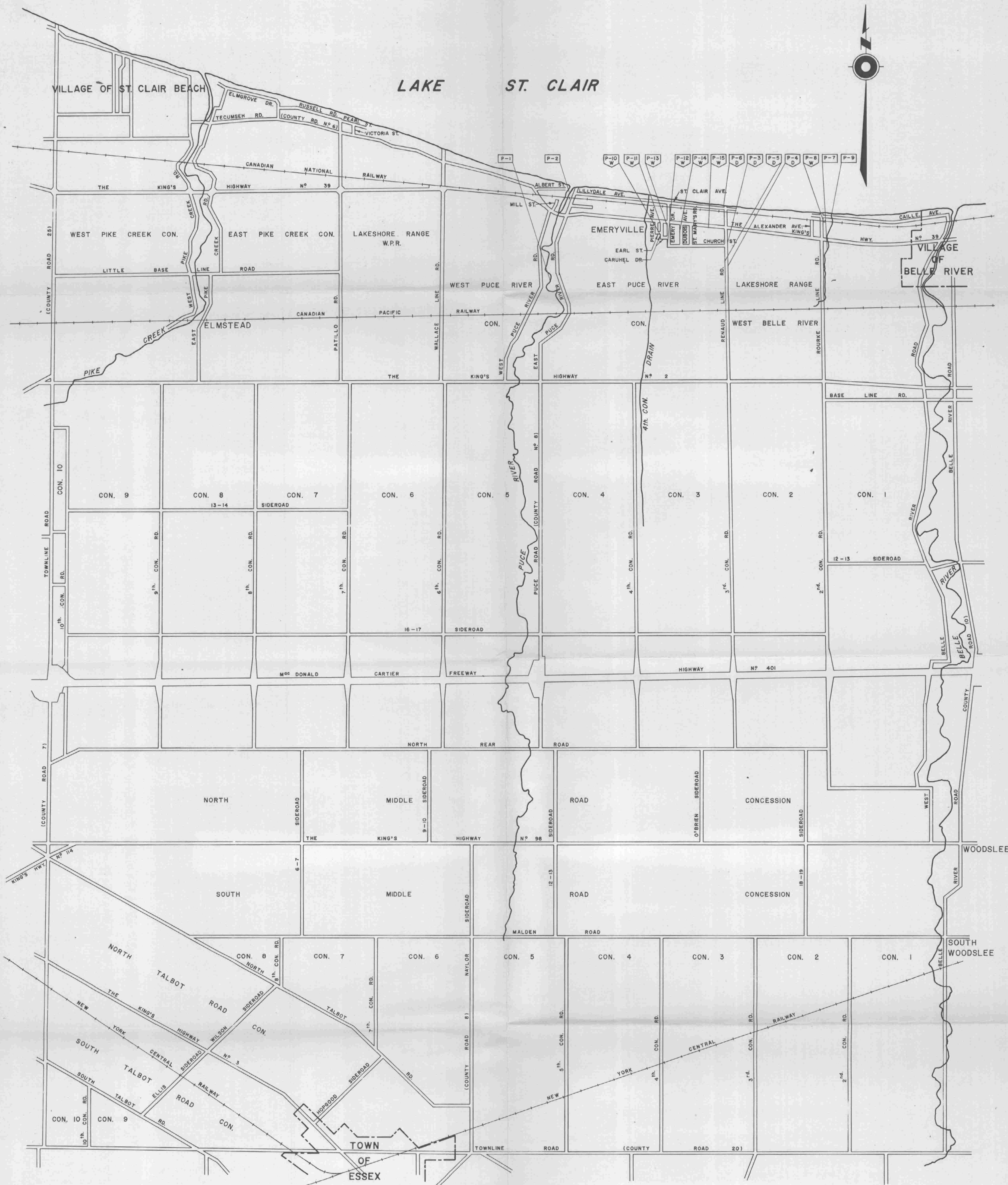
A slight variation of this program could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

DEVELOPMENT

If a municipality, after considering the alternatives, wishes this Commission to consider Provincially-financed projects, application forms should be completed and submitted together with a resolution of the Municipal council. A draft of the suggested wording of the resolution is included with the application forms.

If the proposed works are to be built by the municipality on its own initiative or as a formal project under agreement with this Commission, it is required that the Council retain a consulting engineer to prepare preliminary engineering reports on the proposed work. If a Provincial system is contemplated, no action should be taken with respect to retaining a consulting engineering firm as the Commission will designate a consulting engineer to carry out the Provincial portion of the work and it would be advantageous if the municipal portion be studied and reported on by the same engineer.



LEGEND

- P-13 - SAMPLING POINT SHOWING STREAM AND SAMPLE NUMBER
P-10 W - STREAM AND SAMPLE AT OUTFALL
W - TYPE OF OUTFALL
OUTFALL SYMBOL LETTERS
W - STORM SEWER
D - DITCH

ONTARIO WATER RESOURCES COMMISSION

TOWNSHIP OF MAIDSTONE

WATER POLLUTION SURVEY

1967

SCALE: 1,000 0 1,000 2,000 3,000 4,000 5,000 FEET

DRAWN BY: A.R.S.

DATE: AUG., 1967

CHECKED BY:

DRAWING NO: 67-53